LETTER TO THE EDITOR

New onset of mainly guttate psoriasis after COVID-19 vaccination: a case report

Editor

Psoriasis is a chronic, immune-mediated inflammatory disease with heterogeneous clinical manifestations. Various trigger factors like infections and drugs are known to elicit or aggravate psoriasis. Previously, a possible association of vaccination and the new onset (particularly guttate lesions) or exacerbation of psoriasis has been reported.[1,2] Herein, we describe a case of mainly guttate psoriasis after a COVID-19 vaccination.

A 79-year-old female patient was referred to our department due to a disseminated itching psoriasiform rash, which had started 10 days after receiving the first injection with the COVID-19 vaccination Comirnaty® (BioNTech, Freiburgstrasse, Bern, Switzerland). There was no prior or family history of psoriasis or any other putative triggers (new intake of medication, underlying infections). Her past medical history revealed type-2 diabetes and hypertension and her daily medications (without any recent adaptations) included sitagliptin/metformin, empagliflozin, gliclazide, bisoprolol, enalapril, aspirin and esomeprazole. On examination, there were numerous, disseminated, erythematous papules and partly scaly plaques mainly on the extensor surface of her arms, thighs (Fig. 1a,b), back and scalp. After some improvement with topical clobetasol propionate ointment once daily, the second dose of Comirnaty® was given, which again led to a flare-up particularly on her arms and legs. The patient is currently on treatment with topical calcipotriol/ betamethasone ointment and UVB phototherapy.

In order to characterize the skin lesions, histological [Haematoxylin & Eosin (H&E) staining] and immunohistochemical examinations of a lesional punch biopsy specimen were performed. Histopathological examination showed an acanthotic epidermis with focal loss of the granular cell layer and a compact hyperparakeratosis alternating with orthokeratosis, as well as superficial perivascular lymphohistiocytic infiltrates with a few scattered neutrophils, consistent with guttate psoriasis (Fig. 1c). Immunohistochemical analysis using the avidin-biotin complex-alkaline phosphatase (ABC-AP) method was performed with following primary antibodies: CD1a (clone MTB1; Leica Biosystems, Nussloch, Germany), CD4 (clone 4B12; DakoCytomation, Glostrup, Denmark), CD8 (clone 4B11; Leica Biosystems), CD11c (clone 5D11; Novocastra, Muttenz, Switzerland), CD32 (clone EPR6657; Abcam, Cambridge, MA, USA), CD68 (clone PG-M1, DakoCytomation), CD163 (clone EDHU-1; Serotec MCA, Oxford, UK), CD303/BDCA2 (clone 124B.13, Dendritics, Lyon, France), Mx1 (polyclonal rabbit antibody, GenTex, CA, USA). Irrelevant immunoglobulin G subclass-matched antibodies were used for negative controls. As shown in Fig. 2, a marked infiltration of T cells ($CD4^+ > CD8^+$ T cells) and different

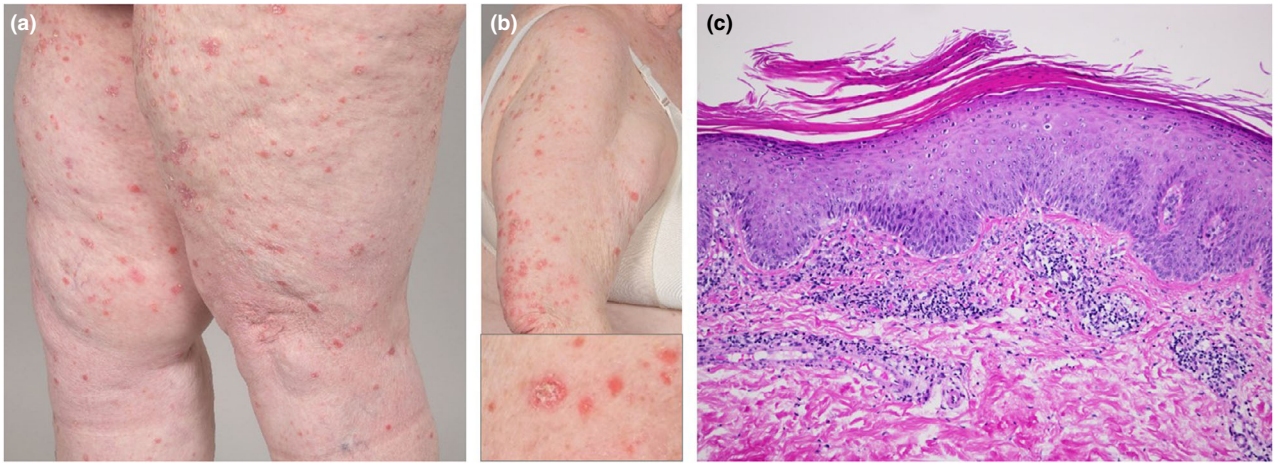

Figure 1 Clinical manifestation with multiple erythematous papules and partly scaly patches (a, b) Histopathological findings showing an acanthotic epidermis with focal loss of the granular cell layer, a compact hyperparakeratosis alternating with orthokeratosis, as well and a superficial perivascular mainly lymphohistiocytic infiltrate (c); (original magnification ×100, haematoxylin and eosin [H&E]).

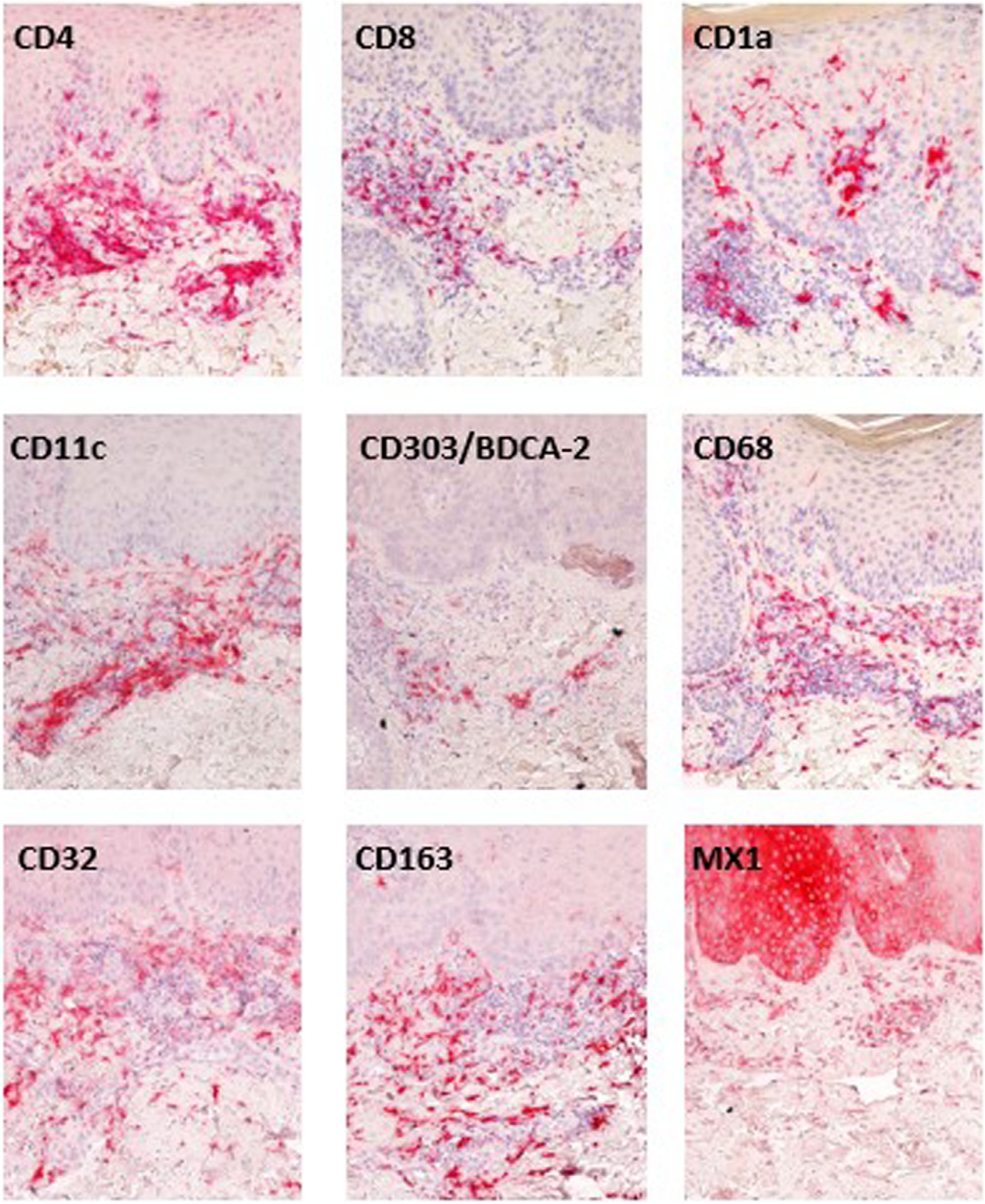

Figure 2 Immunohistochemical analysis of a skin lesion with different leucocyte populations and a surrogate marker of type I interferon activity MX1 (original magnification ×200).

dendritic cell (DC) subsets like Langerhans cells ($CD1a^+$), myeloid DCs ($CD11c^+$) and to a lesser extent plasmacytoid DCs ($BDCA\text{-}2^+$) were found in the skin sections. Furthermore, different macrophage subsets including M1-like (CD68, CD32) and M2-like (CD163) macrophages were also observed. The immune response in psoriasis involves an aberrant interplay of innate and adaptive immunity, and all of these different subsets of dendritic cells, macrophages, and T cells have been associated with the immunopathogenesis of the disease. Myeloid DCs and macrophage are the main source of TNFα and IL-23, which are pivotal cytokines driving the activation and expansion of pathogenic type-17 T cells and subsequent stimulation of keratinocytes in psoriasis. Interestingly, strong focal expression of MX1 [surrogate marker of type I interferon (IFN)] was detected in the keratinocytes and mononuclear infiltrate. Type I IFNs are upregulated in psoriasis and their production by plasmacytoid DCs (pDC) has been reported to initiate psoriasis.[3] Recently, MX1 expression has also been shown to be enhanced in COVID-19 patients and in COVID-19-associated perniosis.[4,5] Single-stranded mRNA vaccines can activate immune responses via binding to Toll-like receptors (e.g. TLR7 on pDCs) resulting in production of type I IFNs, multiple proinflammatory cytokines and both $CD4^+$ and $CD8^+$ T cells.[6] We speculate that such mechanisms may lead to elicitation of guttate psoriasis in susceptible persons. However, whether COVID-19 vaccines directly stimulate local MX1 (Type I IFNs) in the skin remains to be elucidated in future studies. Taken together, the close temporal relationship between the COVID-19 vaccination and the onset of psoriasis (i.e. the repeated flare-up after the second dose) and the lack of any other trigger factors (no infections or new medication) strongly suggests a causal association in this case. With the increasing number of people receiving a COVID-19 vaccination, dermatologists should maintain an index of suspicion for this putative side effect.

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The patient in this manuscript have given written informed consent to publication of her case details.

Conflicts of interest

The authors have no conflict of interest to declare.

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